

## SIX DEGREE OF FREEDOM POSITION RANGING

### ABSTRACT OF THE DISCLOSURE

[0082] An alignment system includes a first module wherein a plurality of emitters are located at defined locations on the face of the first module. The emitters are positioned to emit signals of a known intensity distribution away from the face of the first module. A first receiver configuration is also located on the face of the first module, where the first receiver configuration has a known sensitivity distribution. A second module has a second plurality of emitters located at defined locations on the face of the module. The second plurality of emitters are positioned to emit signals of a known intensity distribution away from the face of the second module. A second receiver configuration is also located on the face of the second module, and has a known sensitivity distribution. First and second trigger signal generators are configured to fire the first and second plurality of emitters, respectively, in predetermined patterns. The generated signals are sensed by at least some of the receivers comprising the first and second receiver configurations. A converter arrangement is operationally connected to the first and second receiver configurations in order to obtain and convert the received signals into digital data representative of the readings received by selected receivers. A processing system is in operational connection to the first converter and the second converter, and computes at least one of an absolute six degree offset or a relative six degree offset between the faces. The offset information is then used to achieve a desired alignment between the face of the first module and the face of the second module. The operational connection of the components for the system may be accomplished via both physical wire type connections as well as through wireless connections.